

Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method of error compensation for measurements taken using a ~~co-ordinate~~ coordinate positioning apparatus comprising an articulating probe head having a surface detecting device, wherein the surface detecting device is rotated about at least one axis of the articulating probe head during ~~measurement~~, the measurements, the method comprising the following steps in any suitable order:

(a) ~~determining the stiffness~~ a stiffness of the ~~whole~~ a whole or ~~part~~ a part of the coordinate positioning apparatus;

(b) ~~determining the load~~ a load or one or more factors which relate to the load applied by ~~the~~ a motion of the articulating probe head about said at least one axis at any particular instant; and

(c) ~~determining the measurement~~ a measurement error at the surface ~~sensing~~ detecting device caused by the load, using ~~the data from~~ data determined in steps (a) and (b).

2. (Original) A method according to claim 1 wherein the load comprises a torque.

3. (Previously Presented) A method according to claim 1 wherein the load comprises a linear force.

4. (Currently Amended) A method according to claim 1 wherein the surface ~~sensing~~ detecting device is a contact probe.

5. (Currently Amended) A method according to claim 1 wherein the surface ~~sensing detecting~~ device is a non-contact probe.

6. (Currently Amended) A method according to claim 1 wherein the stiffness is determined in step (a) by applying a load to the whole or part of the coordinate positioning apparatus and measuring ~~the deflection~~ a deflection.

7. (Currently Amended) A method according to claim 1 wherein the stiffness is determined in step (a) by:

measuring an object of known dimensions to obtain measured dimensions whilst measuring the load applied to the whole or part of the coordinate positioning apparatus;

wherein ~~the deflection~~ a deflection of the whole or part of the apparatus is determined ~~from the~~ based on a difference between the known and measured dimensions of the object; and

wherein the stiffness is derived from the load and the deflection.

8. (Currently Amended) A method according to claim 7 wherein the known dimensions of the object are determined by measuring ~~it at~~ the object at a slow speed.

9. (Currently Amended) A method according to claim 1 wherein the surface ~~sensing detecting~~ device is a contact probe having a workpiece contacting stylus, and wherein the stiffness is determined in step (a) by:

positioning the contact probe so that the workpiece contacting stylus is in contact with ~~the surface~~ a surface of an object of known dimensions;

taking measurement readings of the surface when different probe forces are applied;

wherein ~~the deflection~~ a deflection of the whole or part of the coordinate positioning apparatus is determined ~~from the~~ based on a difference between the known dimensions and ~~measured dimensions;~~ the measurement readings; and

wherein the stiffness is derived from ~~the applied force~~ the probe forces and the deflection.

10. (Currently Amended) A method according to claim 1 wherein the surface ~~sensing detecting~~ device is a contact probe having a workpiece contacting stylus, and wherein the stiffness is determined in step (a) by:

positioning the contact probe so that the workpiece contacting stylus is in contact with ~~the surface~~ a surface of an object of known dimensions;

oscillating the articulating probe head as ~~the probe~~ a probe tip of the articulating probe head remains in contact with the surface;

taking measurement ~~reading~~ readings of the surface when oscillating at different probe frequencies and hence accelerations;

wherein ~~the deflection~~ a deflection of the whole or part of the coordinate positioning apparatus is determined ~~from the~~ based on a difference between the known dimensions and ~~the measured dimensions;~~ measurement readings; and

wherein the stiffness is derived from ~~the acceleration~~ accelerations and ~~deflection;~~ the deflection.

11. (Currently Amended) A method according to claim 1 wherein the one or more factors which relate to the load in step (b) is determined ~~from~~ based on system variables of the coordinate positioning apparatus.

12. (Currently Amended) A method according to claim 11 wherein the one or more factors which relate to the load in step (b) is determined ~~from the~~ based on current applied to at least one motor in the articulating probe head.

13. (Currently Amended) A method according to claim 11 wherein the one or more factors which relate to the load in step (b) is determined by double differentiation of ~~the measurement~~ measurement data from ~~the position~~ a position measuring device in the articulating probe head.

14. (Currently Amended) A method according to claim 1 wherein the one or more factors which relate to the load in step (b) is determined using a torque meter or accelerometer.

15. (Currently Amended) A method according to claim 1, the method ~~including~~ further comprising the step of determining the offset an offset of the ~~measurement a~~ measurement path of the surface ~~sensing~~ detecting device from a datum point, and wherein ~~this~~ the offset is used in calculating the measurement error.

16. (Currently Amended) A method according to claim 15, wherein the measurement error determined in step (c) is substantially proportional to $(L \cos \phi) \delta \theta$, wherein L is ~~the distance~~ a distance from ~~a datum point~~ the datum point, the datum point being in the articulating probe ~~head~~ head, to the measurement path of the surface ~~sensing~~ detecting device, ϕ is ~~the angle~~ an angle between the surface ~~sensing~~ detecting device and an axis normal to ~~the axis~~ an axis of a structure onto which the articulating probe head is mounted and $\delta \theta$ is ~~the~~

~~angular~~ an angular deflection of the ~~mount~~ structure onto which the articulating probe head is mounted.

17. (Currently Amended) A method according to claim 16, wherein the ~~probe surface detecting device~~ is a contact probe and L is the distance between ~~the tip~~ a tip of the ~~surface-sensing detecting device~~ and ~~the centre~~ a center of rotation.

18. (Currently Amended) ~~Co-ordinate~~ A coordinate positioning apparatus comprising an articulating probe head having a surface detecting device, wherein the surface detecting device is rotatable about at least one axis of the articulating probe head, ~~the stiffness~~ a stiffness of ~~the whole~~ a whole or ~~part~~ a part of the coordinate positioning apparatus being known;

the coordinate positioning apparatus being provided with means to determine one or more factors which relate to ~~the load~~ a load applied by a motion of the articulating probe head about said at least one axis at any particular instant;

and wherein the ~~co-ordinate~~ coordinate positioning apparatus includes a processor ~~adapted~~ configured to determine ~~the measurement~~ a measurement error at the ~~surface-sensing detecting~~ device caused by the load, using the known stiffness of the whole or part of the coordinate positioning apparatus and the determined one or more factors relating to the load.